Case Report

Suprascapular Nerve Neuropathy Secondary to Spinoglenoid Notch Ganglion Cyst: Case Reports and Review of Literature

Bernard CS Lee,[1] *MBBS, MRCS (Edin)*, Muthukaruppan Yegappan,[2] *MBBS, FRCS (Glas, Edin), FAMS*, Palaniappan Thiagarajan,[3] *FRCS (Glas), MCh, FAMS*

Abstract

Introduction: Suprascapular nerve neuropathy secondary to ganglion cyst impingement has increasingly been found to be a cause of shoulder pain. Clinical Picture: We present 2 patients who complained of dull, poorly localised shoulder pain, which worsened with overhead activities. Magnetic resonance imaging showed ganglion cysts in the spinoglenoid notch. Treatment: Both patients failed conservative management with physiotherapy and underwent shoulder arthroscopy. One patient underwent arthroscopic decompression of the cyst and the other had open excision of the cyst. Outcome: Both patients experienced resolution of symptoms within 6 months of surgery. Conclusion: With appropriate treatment, suprascapular nerve neuropathy secondary to ganglion cyst impingement is a treatable condition with potentially good results.

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Introduction

Shoulder pain and dysfunction have long been the bane of both the young and old alike. Common causes include local conditions such as rotator cuff tears, impingement syndromes, tendonitis, bursitis, adhesive capsulitis, acromioclavicular joint osteoarthritis, as well as cervical pathology such as disc disease and spondylosis. Suprascapular nerve neuropathy has increasingly been found to be a cause of shoulder pain and dysfunction, especially with the advent of magnetic resonance imaging (MRI) and its use in evaluating shoulder pathology. With appropriate treatment, it has been shown that this is a treatable condition with potentially good results. We present 2 patients with spinoglenoid ganglion cysts as a cause of supraspinatus nerve neuropathy.

Case Reports

Case 1

A 23-year-old full-time national serviceman (army) presented with the complaint of right posterior shoulder pain for 9 months. He also noted difficulty, particularly with overhead activities. He denied any history of trauma or injury to his shoulder.

Physical examination revealed full shoulder range of motion with no clinical evidence of muscle wasting, weakness or shoulder instability. The initial impression was that of a labral tear. He was initially treated with physiotherapy but showed no improvement. A subsequent shoulder MRI revealed a ganglion cyst in the spinoglenoid notch (Fig. 1).

A further course of conservative management with non-steroidal anti-inflammatory drugs (NSAIDs) and physiotherapy for 3 months produced no improvement. An elective arthroscopic decompression of the cyst was then carried out.

A standard posterior portal was used for the viewing arthroscope. Ganglion cysts are usually associated with grade 2 labral tears which create a valve-like effect, very similar to the horizontal cleavage tears of knee menisci which are associated with meniscal cysts. However, in this patient we found only a grade 1 labral tear with just fraying intraoperatively. It is possible that the tear was already healing. The capsulotomy was performed using an accessory posterolateral portal and decompression of the cyst was carried out. Since the bleeding was adequate, the labrum was not repaired using anchors or plain sutures. It was left to heal on its own.

Postoperatively, the pain subsided slowly, with complete resolution of pain after 4 months. Postoperative MRI at 3 months revealed cyst resolution (Fig. 2). He has since returned to full activities.

[1] National Healthcare Group, Singapore
[2] Department of Orthopaedics, Tan Tock Seng Hospital, Singapore
[3] Orthopaedic Sports Medicine, Mt Elizabeth Medical Centre, Singapore
Address for Correspondence: Dr Bernard Lee Chee Siang, 52A Toh Tuck Road, #05-09 Singapore 596744.
Email: bernard.lee@nathealthgroup.com

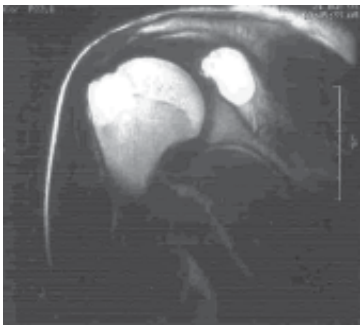

Fig. 1. Preoperative shoulder MRI.

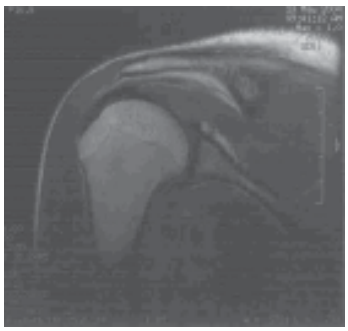

Fig. 2. Postoperative shoulder MRI.

Case 2

A 62-year-old lady presented with vague shoulder pain of several months. This was exacerbated by overhead activities. She also complained of difficulty sleeping due to the pain.

Physical examination revealed full shoulder range of motion. There was no painful arc, nor any muscle wasting or weakness. The impression at the time was that of a rotator cuff tendonitis or tear and she was treated with analgesia and physiotherapy with no improvement. An MRI of the shoulder was subsequently done revealing a spinoglenoid notch ganglion cyst.

After failure of a further trial of non-operative treatment, shoulder arthroscopy was done, revealing no labral pathology. The decision to do an open decompression was made as the cyst was large. A posterior approach was used and the infraspinatus was split to minimise postoperative pain. The main issue with dissection is the suprascapular nerve which runs inferolaterally in the spinoglenoid notch and curves around the lateral margin of the scapular spine to enter the infraspinatus fossa. The ganglion, however, lay superior to the nerve and as such the dissection was performed more superiorly and the ganglion was isolated. We did not try to locate the suprascapular nerve.

Postoperatively, she had slow resolution of symptoms over 3 months. By 6 months, she had complete resolution of symptoms and the muscle wasting had resolved.

In both patients, the operated shoulder was supported in a sling for 10 days and they were encouraged to perform full range of active and passive movements immediately. We did not restrict the patients' shoulder movements postoperatively, as is the usual practice with other shoulder repairs where shoulder immobilisation is imperative.

Discussion

The suprascapular nerve is a mixed peripheral nerve that arises from C5 and C6 roots with variable contribution from C4. The nerve runs to the suprascapular notch and lies in close relation to the posterior border of the clavicle. The suprascapular ligament forms the roof of the suprascapular notch, under which the nerve runs. The nerve then innervates the supraspinatus muscle as it enters the supraspinatus fossa, and receives sensory and proprioceptive branches from the glenohumeral and acromioclavicular joints, as well as the subacromial bursa and posterior aspect of the capsule. In up to 15% of individuals, the nerve also receives cutaneous afferents from the lateral deltoid. The nerve then runs inferolaterally where it wraps around the lateral margin of the scapular spine to pass through the spinoglenoid notch into the infraspinatus fossa, where it is a pure motor nerve supplying the infraspinatus muscle. The spinoglenoid ligament (inferior transverse scapular ligament) is a fibrous connective tissue band which runs from the lateral border of the scapular spine to the margin of the glenoid process. This ligament has been reported with variable prevalence and morphology in cadaveric shoulders[1] with higher prevalence noted in men than women. Kaspi et al[2] showed in their anatomical specimens that the ligament was present in 87% of males, while it was only present in 50% of females.

Suprascapular nerve entrapment/dysfunction at the suprascapular notch was first officially described in 1959.[3] Suprascapular nerve entrapment at the spinoglenoid notch was subsequently reported in 1981.[4]

Suprascapular nerve neuropathy can occur as a result of traction, trauma, infection or extrinsic compression by a space-occupying lesion. Traction injuries more commonly occur at the suprascapular notch where the nerve risks getting tethered, especially with repetitive overhead activities. At the spinoglenoid notch, cross-body adduction and internal rotation of the glenohumeral joint has also been shown to tighten the spinoglenoid ligament, resulting in the stretching of the suprascapular nerve which moves laterally underneath the ligament.[1] Trauma commonly occurs during shoulder dislocations or fractures of the proximal humerus or scapular. Iatrogenic injury also follows distal clavicle resection, nerve traction during intraoperative positioning under general anaesthesia, shoulder arthrodesis and in the posterior surgical approach to the shoulder. Suprascapular nerve neuritis has also been shown to be a cause of suprascapular nerve neuropathy. Finally, the suprascapular nerve can be compressed by ganglion cysts, tumours or haematomas. As mentioned earlier, these ganglia are believed to develop when capsulolabral injuries create a valve-like effect and force synovial fluid into the surrounding tissues, similar to the way meniscal tears of the knee are believed to lead to meniscal cysts. Several authors have noted the high incidence of labral injuries with the presence of adjacent cysts.[5-7]

Patients with suprascapular neuropathy frequently present

with pain and weakness. The pain is usually a dull, poorly localised ache over the posterolateral aspect of the shoulder, which may also radiate to the neck, arm or chest wall. The pain is usually worse with overhead activities and it is also more common if the pathology is at the suprascapular notch rather than at the spinoglenoid notch. Muscle weakness usually manifests as weak external rotation and abduction of the arm.

A history of shoulder trauma or repetitive use of the shoulder is common. Traumatic causes commonly include motor vehicle accidents and falls on outstretched arms. Activities involving repetitive shoulder use associated with suprascapular nerve neuropathy include volleyball, swimming and heavy labour.[5-7]

On examination, there are usually few findings in the early disease process. In chronic disease, there is often wasting of the infraspinatus as well as the supraspinatus if the pathology is at the suprascapular notch. The deltoid bulk is usually unchanged. There may also be tenderness to palpation over the suprascapular or spinoglenoid notch. Objectively, there may be weakness of shoulder abduction and external rotation. Patients with pathology at the spinoglenoid notch may also present as painless and isolated wasting of the infraspinatus muscle as the nerve fibres at the notch contain no sensory afferents. Cross-body adduction with the arm extended or internally rotated tenses the nerve and may reproduce or increase the pain. It should be remembered, however, that this finding is non-specific and may also be present in other shoulder pathology.

The diagnosis of suprascapular nerve neuropathy can be confirmed with electrodiagnostic testing and radiographic imaging. Electromyography (EMG) and nerve conduction (NCS) studies will demonstrate motor loss in the infraspinatus or both the supraspinatus and infraspinatus muscles, depending on the level of the lesion. Denervation potentials, prolonged motor latencies and delay in the conduction time between Erb's point to either muscle will also be present. Plain radiographs may show callus formation at the suprascapular notch or spinoglenoid notch if there has been a previous fracture involving these areas. Ultrasonography as well as MRI of the shoulder for the evaluation of the rotator cuff is useful in demonstrating soft tissue masses such as ganglion cysts which may compress on the suprascapular nerve. This is also especially useful as it delineates the exact location and extent of the lesion. MRI can also assess the stage of paralysis and muscle atrophy.[8] The presence of a cyst does not mean that the nerve is compressed. As such, only EMG and NCS can confirm the diagnosis of suprascapular nerve compression.

Many treatment modalities have been proposed by various surgeons. Most, however, agree that in the absence of a space-occupying lesion, treatment should be conservative, including rest, physiotherapy and NSAIDs. Physiotherapy serves to maintain glenohumeral range of motion and strengthen the rotator cuff muscles. Various authors have reported non-operatively treated patients who had subjectively normal power and range of motion on follow-up.[9] Indeed Ferretti et al[5] even reported infraspinatus atrophy with near normal external rotation strength in asymptomatic professional volleyball players.

Nerve entrapment at the suprascapular notch that do not respond to non-operative management has been shown to benefit from transverse scapular ligament release.

Surgical release of the spinoglenoid ligament has been shown to improve symptoms of pain and weakness in a number of cases, but no study has been conducted to compare non-operative management against surgical release. Therefore, it has been recommended that patients with neuropathy related to impingement at the spinoglenoid notch without evidence of extrinsic compression be treated non-operatively for 6 months, failing which surgical exploration and resection of potentially compressive fibrous tissue and release of the spinoglenoid ligament may be carried out.[10]

Extrinsic nerve compression at the spinoglenoid notch, especially by ganglion cysts, has been shown to have poor results with non-operative management. Nonetheless, these cysts have been known to spontaneously resolve with the resolution of symptoms.[11] Many authors have noted significant symptom relief and functional improvement following surgical treatment. Surgical options reported in the literature include radiologically-guided needle aspiration, open excision, arthroscopic decompression with repair of labral defects, or a combination of the above techniques.

A review of cysts treated by needle aspiration showed a recurrence rate of 48% within 2 years, and failure of the primary procedure in 18% of cases.[11] It has been previously reported that distended veins at the spinoglenoid notch can cause extrinsic compression of the suprascapular nerve. These venous varices should be distinguished from paralabral ganglion cysts, especially in the absence of labral tears if labral aspiration is to be carried out.[12]

There have been numerous reports of patients who improved symptomatically following cyst excision. Traditionally, open cyst excision has been shown to produce good results. Open excision allows the direct visualisation of the cyst and the suprascapular nerve, but is associated with increased morbidity due to the larger incision and muscle detachment. On its own, open excision does not evaluate the glenoid labrum for labral defects, which may result in cyst recurrence. Increasingly, arthroscopic management of these cysts has been shown to produce similar results with symptomatic relief, without the

associated morbidity of an open excision. Arthroscopic management also allows concomitant labral pathology to be addressed, and has been shown to have a lower risk of cyst recurrence when compared to open excision.[7,11,13] These patients are also able to begin rehabilitation earlier due to the less extensive surgical dissection, with earlier return to normal activities. A combination of arthroscopic debridement and open cyst excision is also possible. This has been shown to have comparable results with low recurrence rates.[6,11,13]

A handful of studies have been done to compare the different modalities of treatment in suprascapular nerve neuropathy. In a retrospective review of 73 patients with MRI-identified spinoglenoid notch cysts by Piatt et al,[11] patients were divided into 4 groups of treatment protocols, namely 1) non-operative management, 2) needle aspiration, 3) isolated arthroscopic treatment of a labral defect with no cyst excision, and 4) open or arthoroscopic surgical excision of the cyst with labral defect fixation. A comparison of patient satisfaction in each group revealed that patients who underwent surgical excision of the cyst with labral defect fixation (group 4) had higher satisfaction compared to the other groups, and also that patients undergoing surgical treatment (groups 3 and 4) had higher satisfaction rates compared to the non-operative treatment groups (groups 1 and 2).

Antoniou et al[13] compared the functional outcome of operative and non-operative treatment in 53 consecutive patients to determine the preferred treatment modality for compressive neuropathy of the suprascapular nerve. They found that spinoglenoid notch cysts responded better to surgical treatment, with the results between open surgery and arthroscopic decompression being similar. They thus recommended that arthroscopic intervention should be preferred due to its lower morbidity as well as its ability to obtain an intra-articular evaluation. They also recommended that patients with radiologically documented cysts but with minimal electromyographic abnormalities undergo a careful evaluation and treatment of all other intra- and extra-articular pathology as their symptoms may not be secondary to the cyst but due to other pathology around the shoulder.

There are several learning points from our experience with these 2 cases. Firstly, a spinoglenoid notch ganglion cyst should be a differential for patients with vague shoulder pain, especially those with posterior shoulder pain. Secondly, if infraspinatus atrophy is present, then an early MRI scan is warranted to confirm the diagnosis and plan the surgical approach. Finally, arthroscopic decompression of the ganglion cyst is possible with an accessory postero-lateral portal.

Conclusion

Suprascapular nerve neuropathy has been shown to be a cause of shoulder pain and dysfunction. Treatment of suprascapular nerve neuropathy secondary to ganglion cyst impingement includes a period of non-operative therapy. Patients who fail conservative management should undergo surgical cyst excision or decompression. As these cysts have been strongly associated with labral pathology, shoulder arthroscopy is also indicated to address the labral tear, as failure to do so has been associated with a higher recurrence rate. The arthroscopic approach has advantages over the open technique in that it has much less morbidity, allows labral tears to be repaired, and permits faster recovery and return of limb function.

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